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Helmet and Autonomous Driving Detection using Machine Learning

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Abstract: *In developing countries, motorcycles have long been the predominant form of transportation. Motorcycle accidents have increased in recent years. A motorcyclist's failure to wear a protective helmet is one of the leading causes of fatalities in accidents.. The most common way to ensure that motorcyclists wear a helmet is by traffic police to manually monitor motorcyclists at road junctions or through CCTV footage and to penalise those without a helmet. But it requires hu-man intervention and effort. So this system Proposes an automated system for detecting motorcyclists who do not wear a helmet and retrieving their autonomous driving from CCTV video footage First, the system classifies moving objects as motorcycling or non-motorcycling. In the case of a classified motorcyclist, the head portion is located and classified as a helmet or non-helmet. Finally, for the motorcyclist identified without a helmet, then autonomous driving is detected and the characters on it are extracted by using the OCR algorithm.*

Keywords: Image Selection, Extraction, Machine learning

I. INTRODUCTION

1.1 Motivation

In countries like India, Brazil, Thailand, the majority of the population uses motor- cycles for daily commute. In most of these countries, wearing a helmet for motorcyclists is mandatory by law. In addition, when it comes to motorcycle safety, wearing a helmet is essential. Currently, in practice, Traffic Police are entrusted with the task of ensuring that motorcycle riders wear helmets. But, this method of monitoring motorcyclists is inefficient due to insufficient police force and limitations of human senses. In addition, CCTV surveillance is used in all major cities. But, those require human assistance and are not automated. Due to the increasing number of motorcycle accidents and the concern for human safety, there has been a growing amount of research in the domain of road transport. The system proposed in this paper automates the task of monitoring motorcyclists. The system detects motorcyclists not wearing helmets and retrieves their autonomous driving in real time from videos captured by CCTV cameras at road junctions by making use of Machine Learning.

1.2 Problem Definition

In India road accidents are increasing very rapidly and lots of deaths are occurred due to head injuries because of the number of people not wearing helmets, so to avoid the system that automatically detects the peoples who are not wearing helmet and also detect Autonomous Driving of that person.

II. LITERATURE SURVEY

No	Title	Author	Description
1	Automated Helmet Detection for Multiple Motorcycle Riders using CNN	Madhuchhanda Dasgupta, Oishila Bandyopadhyay, Sanjay Chatterji, Computer Science Engineering IIIT Kalyani West	Any intelligent traffic system must include automated detection of traffic rule offenders. In a country like India with a high density of population in all big cities, motorcycles are one of the main modes of transport. It is observed that most motorcyclists avoid the use of helmets within the city or even on highways. Use of helmets can reduce the risk of head and severe brain

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		Bengal, India	injury of the motorcy-clists in most motorcycle accident cases. Today violations of most of the traffic and safety rules are detected by analysing the traffic videos captured by surveillance cameras. This paper proposes a framework for detection of single or multiple riders travelling on a motorcycle without wearing helmets. In the proposed approach, at first stage, motorcycle riders are detected using YOLOv3 model which is an incremental version of YOLO model, the state-of-the-art method for object detection. The suggested model has been tested on traffic footage, showing promising results when compared to other CNN-based techniques.
2	Helmet and Number Plate detection of Motorcyclists using Deep Learning and Advanced Machine Vision Techniques	Fahad A Khan, Nitin Nagori, Dr. Ameya Naik, Department of Elec-tronics Telecommunication K.J.Somaiya college of Engineering Mumbai, India	In today's world, the increasing use of Motorcycles has prompted incre-ment in road accidents and injuries.One of the biggest causes is that the motorbike rider does not wear a helmet. Currently, one technique is to physically check for helmet use at the pavement junction or to use CCTV surveillance video to detect riders without helmets, which involves human intervention. The proposed framework presents a computerization machine structure to distinguish the motorcycle rider with or with-out helmet from images. The system extracts objects based on features extracted. The system uses You Only Look Once (YOLO)-Darknet deep learning framework which consists of Convolutional Neural Networks trained on Common Objects in Context (COCO) and combined with computer vision. YOLO's convo-lutional layers are modified to detect specified three classes and it uses a sliding-window process. The map (Mean Average Precision) on validation dataset achieved 81% by using training data.
3	Helmet Detection Using ML&IoT	Dikshant Manocha, Ankita Purkayastha, Yatin Chachra, Namit Rastogi, Varun Goel Department of Electronics and Communication Engineering Jaypee In-stitute of Information Technology Noida, India	This paper is about detecting two-wheeler riders without helmets with the help of machine learning and providing them with a user interface to pay challans. The suggested method collects a real-time image of road traffic before distinguishing two-wheelers from other vehicles on the road. It then processes to check whether the rider and pillion rider are wearing a helmet or not using OpenCV. If any one of the riders and pillion riders found not wearing the helmet, their vehicle number plate is processed using optical character recognition (OCR). After extract-ing the vehicle registration number, a challan will be generated against each vehicle and all the details of the challan will be sent via Email and SMS to the con-cerned person. An user interface (an app and a website) will also be provided to pay their challans.
4	Convolutional Neural Network-based Automatic Extraction and Fine	Y Mohana Roopa, Sri Harshini Popuri, Gottam Gowtam sai	Numerous reasons lead to dangerous accidents. Lack of a helmet is one of the major reasons for death during accidents. People are negligent regarding hel-met

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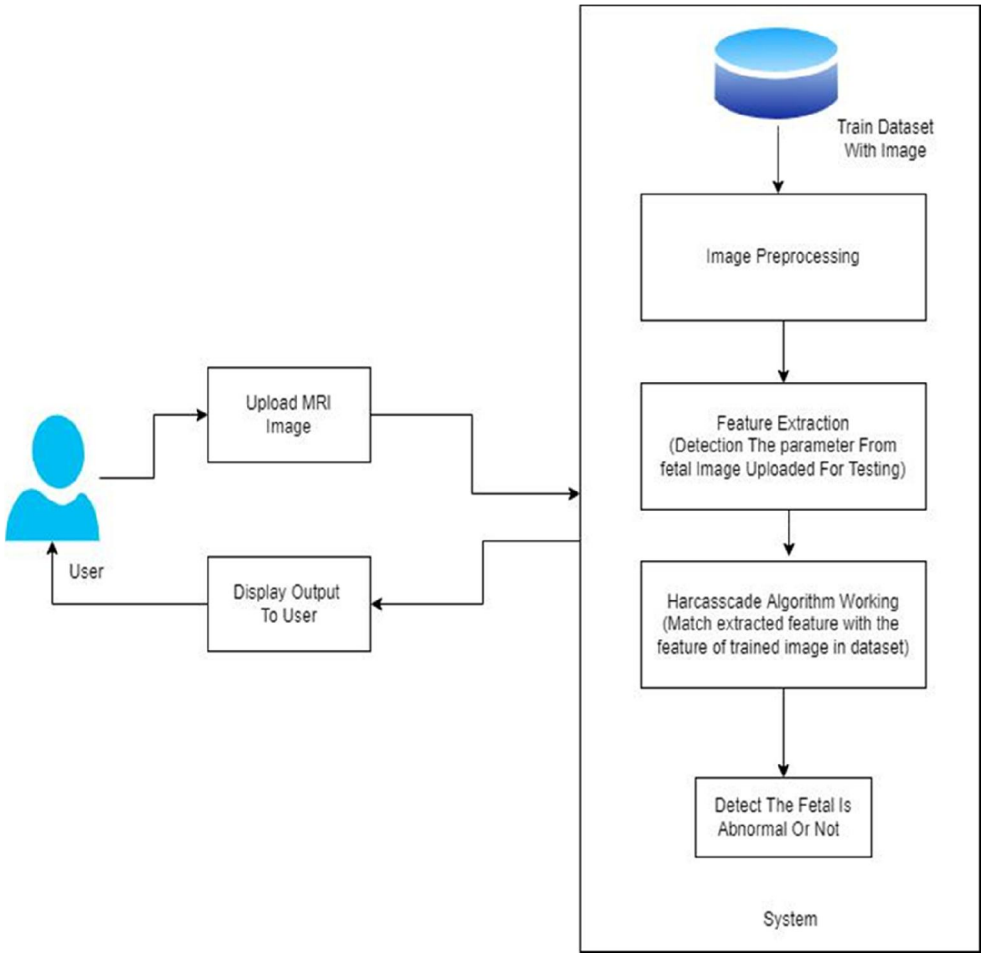
	Generation	Sankar, Tejesh Chandra Kuppili, Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India	usage.Proper supervision is required to keep this under control. The current traffic control system relies heavily on human effort. A police officer cannot control all traffic while also keeping an eye out for violators of the rules. It would be a very tough job and will need a lot of human power to cover all the areas. This can be solved through our new automated system where two-wheelers with no helmets will be recognized through yolov2 and the respective frames are taken from the video from which the number plate of the particular vehicle is extracted and the fine for disregarding traf-fic rules. This fine detail will be updated over the server and a message is sent to the phone number registered along with the number plate. This paper is about an automated system where traffic surveillance videos are scavenged for vehicles, where extrac-tion of number plates of vehicles with no helmet and generation of electronic fine management system takes place.

III. System Architecture



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In this paper, we presented the above system architecture. To Access our portal, first the system needs to be set up at the location. The owner who is setting up the system must register on our portal. After Successfully Registering on the portal, the credentials are being stored in a database that is hosted on a database browser. Users will be forwarded to the Home page as logged-in users if their credentials match during login.Else if Credentials will not match with our database user will get an invalid popup. After successfully login in, the camera will be open and start the detection. In the image itself a message will be shown according to detection whether the person is wearing a helmet or not. Message is "helmet:(percentage accuracy)" or "no helmet:(percentage accuracy)".

3.1 CNN Algorithm

The algorithm we proposed for this project is the CNN algorithm. This algorithm is taken into consideration because it gives more accurate results. In deep learning, Convolutional Neural Network(CNN) is a neural network used to analyse images. As we hear about neural networks, we think it's all about matrix multiplication but in CNN that's not the case. CNN works with a special technique called Convolution. According to mathematics, Convolution is an operation on two functions which give us a third output function. But we don't need to go so deep to understand CNN.

Convolutional neural network is a multiple layer of artificial neurons. Each layer generates activation functions that are transmitted to the next layer when a picture is delivered through CNN. In short when an image is captured its features are in multiple layers. In CNN we extract the features and compress the multiple layered data. A Pooling layer follows the Convolutional layer. Similar to Convolution, Pooling is reducing the spatial size. By lowering the dimensions, pooling reduces the processing power. Image goes through these two layers repeatedly until we do not get a particular matrix form of image where no more compression can be performed.

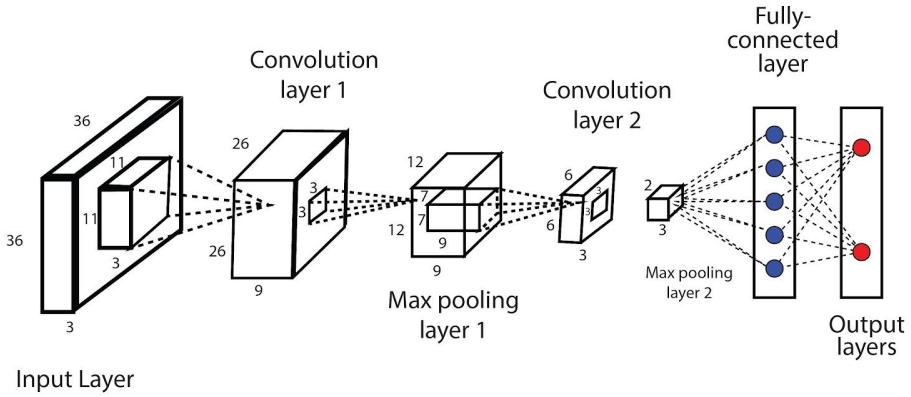

Figure2: CNN Algorithm

IV. Conclusion

In this paper we have described a framework for automatic detection of motorcycle riders without helmets from CCTV video and Autonomous driving of that person. The use of Convolutional Neural Networks (CNNs) and transfer learning has helped in achieving good accuracy for detection of motorcyclists not wearing helmets. The accuracy obtained was 98.72%. But, only detection of such motorcyclists is not sufficient for taking action against them. So, the system also recognises the Autonomous Driving of the motorcyclists and stores them.

References

[1]. R. R. V. e. Silva, K. R. T. Aires, and R. d. M. S. Veras, "Helmet Detection on Motorcyclists Using Image Descriptors and Classifiers," 2014 27th SIBGRAPI Conference on Graphics, Patterns, and Images, pp. 141-148, Rio de Janeiro, 2014.

[2]. P. Douangmala and K. Klubsuwan, "Detecting Helmet Wearing in Thailand Using Haar Like Feature and Circle Hough Transform on Image Processing," IEEE International Conference on Computer and Information Technology (CIT), Nadi, 2016, pp. 611-614.

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[3]. J. Liu, H. Liu, T. Wang, M. Jiang, S. Wang, K. Li, and X. Zhao (2017, Febru-ary). Image processing and machine learning are used to detect the wearing of a safety helmet. The Ninth International Conference on Advanced Computational Intelligence (ICACI) was held in 2017. (pp. 201-205). IEEE.

[4]. K. Dahiya, D. Singh, and C. K. Mohan, "Automatic detection of bike-riders without helmets in real-time using surveillance films," 2016 International Joint Conference on Neural Networks (IJCNN), Vancouver, BC, pp. 3046-3051.

[5]. C. Vishnu, D. Singh, C. K. Mohan, and S. Babu, "Detection of motorcyclists without helmets in movies using convolutional neural networks," 2017 International Joint Conference on Neural Networks (IJCNN), Anchorage, AK, pp. 3036-3041, 2017.

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